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(54) Espagnolette type mechanism

(57) An operating mechanism (3) for a door or window fastener in which two slidably mounted locking bars (1, 2) are driven by the operating mechanism simultaneously in opposite directions to fasten or unfasten the door or window comprises a drive member (21) driven by the spindle of an operating handle and a pair of linearly guided reciprocable slide plates (13, 14) which are connected to the drive member (21) by pin and slot connections (26, 23a) and (27, 24a) at diametrically opposite positions with respect to the axis of rotation of the drive member so that the two slide plates move linearly in opposite directions. The fastener may be of the espagnolette type and/or the locking bars (1, 2) may be arranged to operate pivoted head shaped locking members (42).

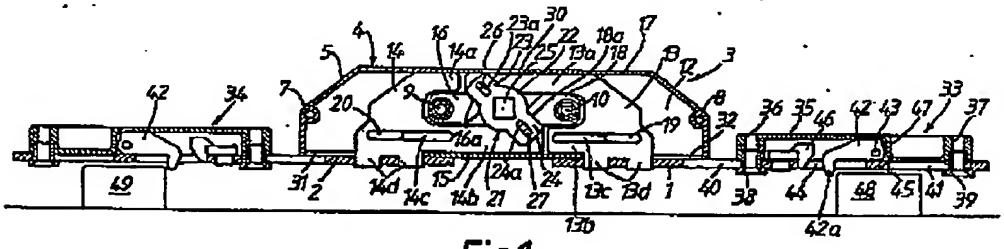

Fig.1.

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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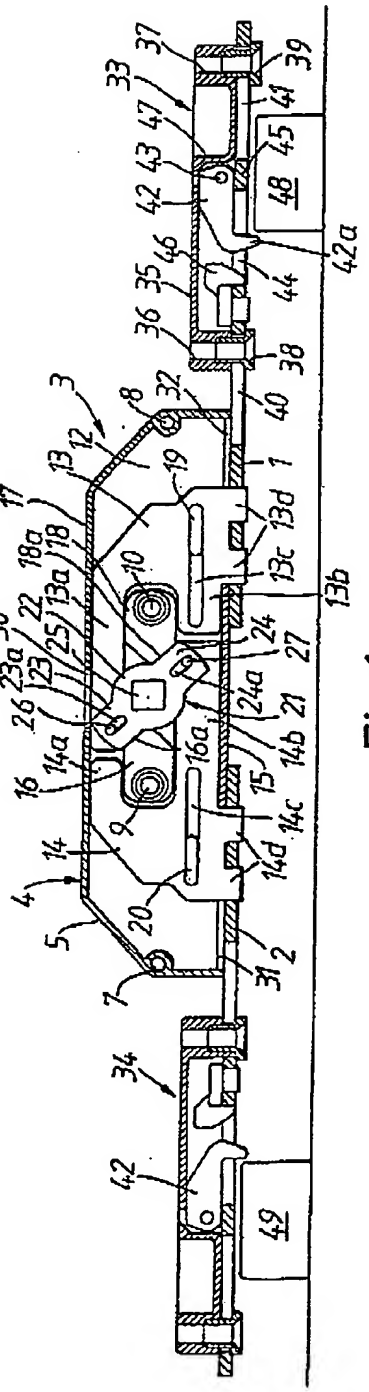

Fig.1.

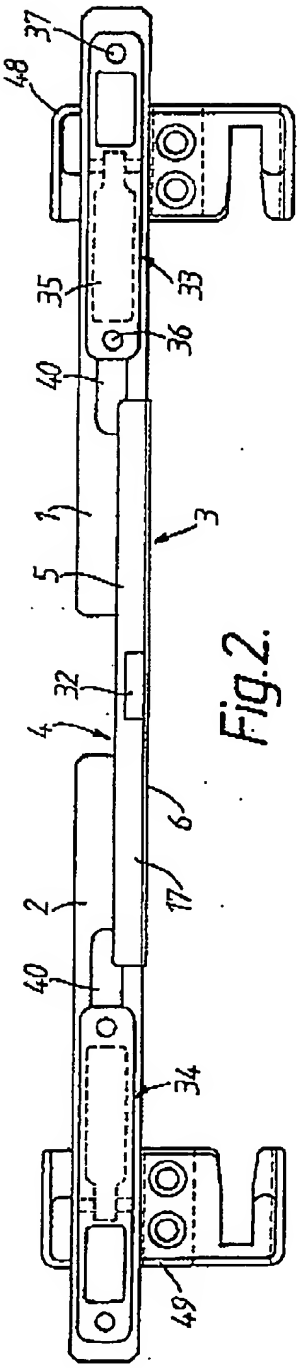

Fig.2.

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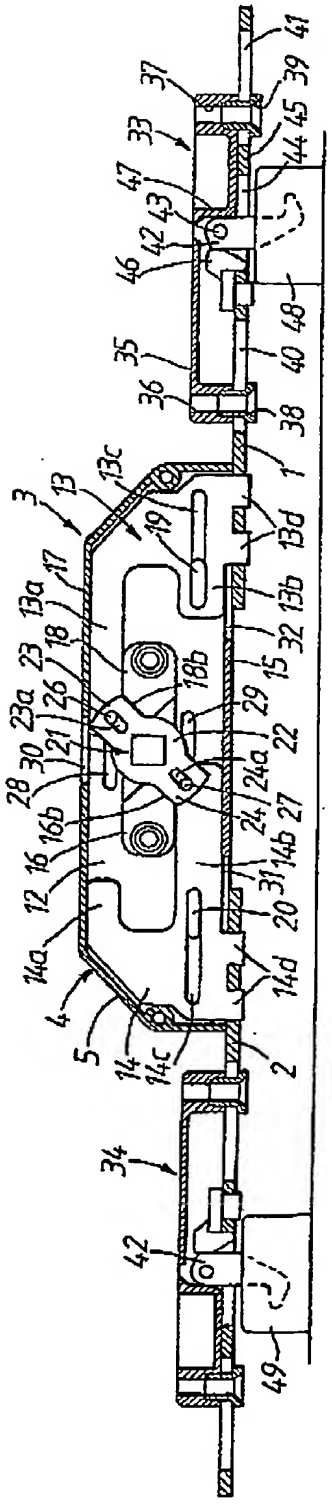
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Fig.3.

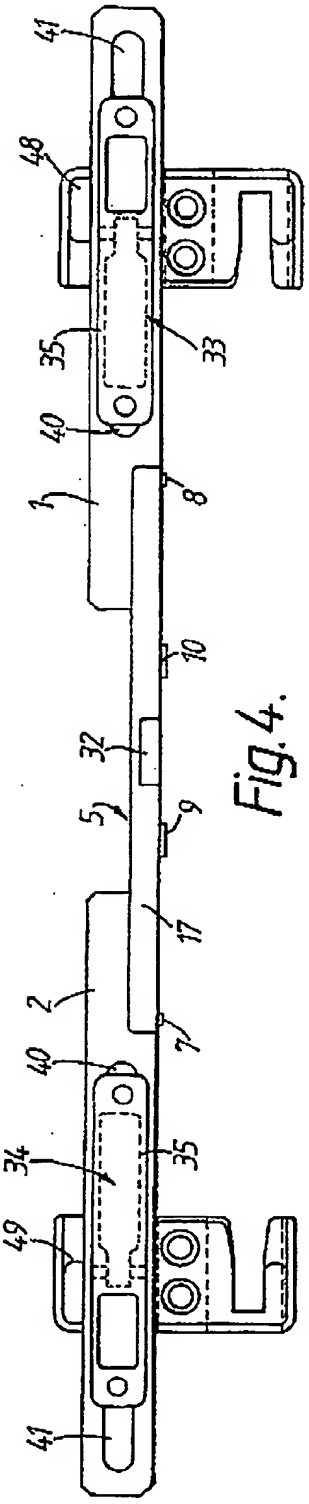
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Fig.4.

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# OPERATING MECHANISM FOR ESPAGNOLETTES AND OTHER SIMILAR FASTENERS

The invention relates to door or window fasteners of the type in which two slidably mounted locking bars are driven simultaneously in opposite directions to fasten or unfasten the door or window, and also relates to an operating mechanism for such fasteners.

One example of such a fastener is the well known espagnolette fastener in which the locking bars are mounted on the openable part of the door or window and the ends of the bars are arranged to engage in keepers provided on the fixed frame when the bars are driven to fasten the door or window in the closed position. In one variant of this type of fastener the bars carry perpendicularly projecting headed locking pins which are arranged to engage in keyhole shaped slots provided in the fixed frame. Alternatively, the pins may be provided on the frame and the slots in the locking bars.

Generally, the locking bars are driven by an operating mechanism, commonly referred to as the gearbox which is also mounted in or on the openable part of the door or window and which is actuated by turning a handle. Various mechanisms are known for translating the rotary

movement of the handle into opposed linear movements which are imparted to the locking bars, a common mechanism comprising a pinion which is rotated by turning the handle and which is mounted between a pair of racks connected to the locking bars. However, existing mechanisms of this type tend to be rather bulky.

According to the invention, an operating mechanism for a door or window fastener in which two slidably mounted locking bars are driven by the operating mechanism simultaneously in opposite directions to fasten or unfasten the door or window comprises a drive member which is intended to be driven by the spindle of an operating handle so as to turn with the handle, a first linearly guided reciprocable slide plate which is connected to the drive member by a first pin and slot connection, and a second linearly guided reciprocable slide plate which is connected to the drive member by a second pin slot connection at a position substantially diammetrically opposite the first pin and slot connection with respect to the axis of rotation of the drive member so that the two slide plates are caused to move linearly in opposite directions to each other whenever the drive member is rotated by turning the operating handle.

Such an arrangement enables an operating mechanism to be

constructed which is very slim in the direction which is perpendicular to the plane of the slide plates, particularly when the two slide plates are mounted to slide in a substantially common plane.

Preferably the drive member and the slide plates are housed in a casing, and the slide plates are guided linearly within the casing by interengaging guide means provided on the slide plates and the casing.

In the case where the pin of each pin and slot connection is carried by the respective slide plate, the slot being provided in the drive member, the guide means may include the said pins carried by the slide plates and respective guide slots which are formed in at least one of the casing side walls and which receive the pins and extend parallel to the direction of movement of the slide plates.

Alternatively or additionally, the guide means may include a slot in each of the slide plates extending parallel to the direction of movement thereof, and a pair of lugs which are provided on the casing and are received in the slide plate slots.

A pair of stop members may be mounted within the casing to limit the turning of the drive member in each

direction, and hence the travel of the slide plates.

In use, each slide plate is secured firmly to a respective one of the two locking bars of the fastener. Generally the operating mechanism will be arranged so that the plane or planes of the slide plates lie substantially perpendicular to the plane in which the locking bars lie, and each slide plate has a portion which projects through a slot in one edge of the casing and by which the slide plate is attached to the respective locking bar.

As mentioned earlier, the fastener may be of the espagnolette type. Alternatively or additionally, the locking bars of the fastener may be arranged to operate locking members which are pivotally mounted in fixed housings such that the locking members are engaged by the locking bars and caused to rock to a projecting, fastening position when one of the bars is moved in one direction and the other bar is moved simultaneously in the other direction, and the locking members are engaged by the locking bars and caused to rock back to a retracted, unfastening position when the bars are moved in the opposite directions.

Such a fastener construction is in fact novel in its own

right, i.e. independently of the construction of the operating mechanism which drives the locking bars, and forms a further aspect of the present invention.

The locking members are preferably moved to the fastening position when the locking bars are moved away from each other. In the fastening position, the locking members, which may be in the form of hooks, are arranged to engage in corresponding recesses or sockets provided in or on the fixed frame of the door or window facing the locking bars.

Preferably the locking bars overlie the locking member housings and are provided with actuator slots through which the locking members are arranged to move, each locking member being engaged by one end of the respective actuator slot to move it to the fastening position, and by the other end of the actuator slot to move it back to the unfastening position.

In a preferred embodiment, the locking bars are provided with further slots forming guide slots through which project headed guide pins carried by the locking member housings.

One embodiment of a fastener and operating mechanism in

accordance with the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:-

Figure 1 is a part sectional, side elevation of the fastener and its operating mechanism in the unfastening position;

Figure 2 is a plan view of the fastener as shown in Figure 1;

Figure 3 is a view similar to that of Figure 1, but showing the fastener and operating mechanism in the fastening position; and

Figure 4 is a plan view of the fastener as shown in Figure 3.

The fastener illustrated in the drawings comprises two longitudinally slidable, flat locking bars 1 and 2 which are disposed in line with each other in a common plane and which are connected at their proximal ends to an operating mechanism 3 for moving the locking bars 1 and 2 away from each other to engage the fastener and back towards each other to release the fastener.

The operating mechanism 3 comprises an elongate, shallow casing 4 formed by a casing shell 5 and a cover plate 6 which is secured to the shell 5 by means of bolts, screws or rivets received in tubular sockets 7,8,9 and 10 carried by the casing shell. The casing 4 overlies the proximal end portions of the locking bars 1 and 2, bridging the gap 11 between the bars, and is disposed with the median plane of the casing (i.e. the plane parallel to the cover 6 and the opposite wall 12 of the casing shell 5) substantially perpendicular to the plane of the locking bars 1 and 2. As can be seen from Figures 2 and 4, the width of the casing 4 in the direction perpendicular to its median plane is much less than the width of the locking bars 1 and 2, and the casing 4 is offset to one side of the longitudinal centre line of the bars so that the side wall defined by the cover 6 of the casing lies substantially in line with one side edge of the bars.

The operating mechanism 3 also comprises two slide plates 13 and 14 which are slidably mounted in a common plane within the casing 4 so that each is movable longitudinally between a position at a respective end of the casing 4 as shown in Figure 3 and a nearly meeting position as shown in Figure 1, the slide plates 13,14 being guided linearly as described below. Each slide

plate 13,14 has a pair of spaced, unequal length limbs 13a,13b and 14a,14b extending in a longitudinal direction towards the other plate. The longer limb 14b of the slide plate 14 lies adjacent the longitudinal edge wall 15 of the casing which overlies the proximal end portions of the locking bars 1 and 2, and extends closely between this edge wall 15 and a guide block 16 which is fixed to the casing side wall 12 in the region of the socket 9. The shorter limb 14a of the slide plate 14 lies adjacent the longitudinal edge wall 17 of the casing opposite the edge wall 15 and, in the meeting position of the slide plates shown in Figure 1, extends closely between the edge wall 17 and the guide block 16. Conversely, the longer limb 13a of the slide plate 13 lies adjacent the longitudinal edge wall 17 of the casing and extends between this edge wall 17 and a guide block 18 carried by the casing side wall 12 in the region of the socket 10, whereas the shorter limb 13b lies adjacent the longitudinal edge wall 15 and extends closely between this wall and the guide block 18 when the slide plates are in the meeting position. Each slide plate 13,14 is also provided with a longitudinally extending guide slot 13c,14c for receiving a guide element 19,20 respectively carried by the casing side wall 12.

The operating mechanism 3 further comprises a drive

member 21 positioned between the two guide blocks 16 and 18, the drive member 21 having a central hub portion 22 and two diametrically opposite arms 23 and 24 extending radially from the hub portion. The hub portion 22 has a square central aperture 25 for receiving the square sectioned spindle of an operating handle (not shown), and each of the arms 23 and 24 is provided with a radially directed slot 23a,24a. The slot 23a receives a pin 26 carried by the longer limb 13a of the slide plate 13, and the slot 24a receives a pin 27 carried by the longer limb 14b of the slide plate 14, whereby the slide plates 13 and 14 are connected to the drive member 21. The drive member 21 is rotatable by means of the operating handle between a first limit position defined by stop surfaces 16a and 18a which are provided on the guide blocks 16,18 and are engaged by the arms 23 and 24 of the drive member 21 as shown in Figure 1, and a second limit position in which further stop surfaces 16b and 18b provided on the guide blocks 16 and 18 are engaged by the arms 23 and 24 of the drive member as shown in Figure 3. Rotation of the drive member 21 between the two limit positions causes the slide plates 13 and 14 to slide simultaneously in opposite directions as a result of the pin and slot connections 26,23a and 27,24a, the plates moving to the meeting position shown in Figure 1 when the drive member is moved to its first limit position, and moving to the

spaced position as shown in Figure 3 when the drive member 21 is moved to the second limit position.

It will be noted that the pins 26 and 27 carried by the slide plates 13 and 14 also project into a pair of longitudinally extending guide slots 28,29 respectively provided in the casing side wall 12 as can be seen in Figure 3. It will also be noted that in order to reduce the height of the casing 4 (i.e. in the direction perpendicular to the plane of the locking bars 1 and 2), the edge wall 17 is provided with a slot 30 to allow the free end of the arm 23 of the driving member 21 to pass unhindered as the driving member moves between its two limit positions.

Each slide plate 13,14 has a pair of lugs 13d,14d projecting from it through a respective slot 31,32 in the longitudinal side edge 15 of the casing 4. The lugs 13d of the slide plate 13 are received in a pair of aligned holes in the proximal end portion of the locking bar 1 and are firmly fixed in the holes in any suitable manner so as to secure the locking bar 1 and the slide plate 13 together. Similarly, the lugs 14d of the slide plate 14 are received and fixed in aligned holes in the proximal end portion of the locking bar 2 so as to secure the locking bar 2 and the slide plate 14 together.

Accordingly, the locking bars 1 and 2 are driven simultaneously in opposite directions towards or away from each other when the slide plates 13 and 14 are similarly driven by the drive member 21 by turning the operating handle.

In use, the operating mechanism and the locking bars of the fastener will usually be fitted to the edge face of the openable part of a window or door opposite the hinged edge, the operating mechanism 3 being recessed into the frame of the openable part. In the case of a window in which the frame of the vent is formed from extruded sections made of aluminium or plastics such as UPVC, the locking bars may be fitted into the "euro-groove" of the frame, with the operating mechanism 3 projecting through a slot cut in the base of the groove. If preferred, however, the fastener may be located close to the inside face of the frame, the extremely slim construction of the operating mechanism 3 enabling the mechanism to fit easily into the inner upstand of the frame.

As mentioned earlier, the fastener may be of the espagnolette type in which the distal ends of the locking bars 1 and 2 are arranged to engage with keepers mounted on the fixed frame of the door or window when the bars are driven away from each other to fasten the door or

window. In the present example, however, the movement of the locking bars 1 and 2 away from and back towards each other is arranged to operate a pair of locking mechanisms 33 and 34 associated with the locking bars 1 and 2 respectively. The two locking mechanisms 33 and 34 are identical to each other, and for convenience only one of the mechanisms 33 will be described.

As shown, the locking mechanism 33 comprises an elongate housing 35 disposed on the same side of the locking bar 1 as the operating mechanism 3, the housing 35 being aligned with the locking bar and having a pair of fixing holes 36 and 37 at opposite ends by which the housing can be fixed in the desired position to the openable part of the window or door by screws or other suitable headed fixing elements when the fastener is installed. In addition to securing the housing 35 in position, the fixing elements serve to secure in place a pair of flanged guide sleeves 38 and 39 which are aligned with the bores 36 and 37 respectively and project through respective longitudinally spaced guide slots 40 and 41 in the locking bar 1. The flanged heads of the guide sleeves 38 and 39 overlie the locking bar 1 on opposite sides of the guide slots 40 and 41 and serve to maintain the locking bar in close sliding relation over the housing 35 as the locking bar is moved longitudinally

forwards and backwards by the operating mechanism.

The locking mechanism 33 further comprises a hook shaped locking pawl 42 which is pivotally mounted on a transverse pivot pin 43 so that it is pivotable between a retracted, inoperative position within the housing 35 as shown in Figure 1, and an operative position in which it projects substantially perpendicularly from the housing as shown in Figure 3 through a longitudinal actuator slot 44 provided in the locking bar 1 between and in alignment with the guide slots 40 and 41. When the locking bar 1 is withdrawn towards the other locking bar 2 by the operating mechanism 3, the distal end of the actuator slot 44 engages the locking pawl 42 and causes it to rock back into the housing 35 to its retracted position as shown in Figure 1. In this position, the portion 45 of the locking bar 1 between the slots 44 and 41 overlies the pivoted end of the locking pawl to hold the locking pawl in the retracted position. It will be noted, however, that in the retracted position the hooked end 42a of the locking pawl still projects slightly through the actuator slot 44. Thus, when the locking bar 1 is driven by the operating mechanism 3 in a direction away from the other locking bar 2, a driver cam 46 carried by the locking bar 1 at the proximal end of the actuator slot 44 engages the hooked end 42a of the locking pawl as

the portion 45 moves clear of the pivoted end thereof. Interaction between the driver cam 46 and the locking pawl 42 as the locking bar 1 is moved further away from the other bar 2 then causes the locking pawl 42 to rock towards and into the operative position shown in Figure 3. In this position, the locking pawl 42 is held firmly between the driver cam 46 and an abutment wall 47 of the housing 35 lying substantially perpendicularly to the plane of the locking bar.

In its operative position, the locking pawl 42 of each locking mechanism 33,34 engages a respective keeper member 48,49 which is mounted on the fixed surrounding frame of the window or door, thereby fastening the door or window and preventing it from being opened until the operating handle is turned to move the locking bars back towards each other, thereby disengaging the locking pawls 42 from the keepers 48 and 49 and moving them back to the inoperative, retracted position.

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CLAIMS

1. An operating mechanism for a door or window fastener in which two slidably mounted locking bars are driven by the operating mechanism simultaneously in opposite directions to fasten or unfasten the door or window, comprising a drive member which is intended to be driven by the spindle of an operating handle so as to turn with the handle, a first linearly guided reciprocable slide plate which is connected to the drive member by a first pin and slot connection, and a second linearly guided reciprocable slide plate which is connected to the drive member by a second pin and slot connection at a position substantially diammetrically opposite the first pin and slot connection with respect of the axis of rotation of the drive member so that the two slide plates are caused to move linearly in opposite directions to each other whenever the drive member is rotated by turning the operating handle.

2. An operating mechanism according to claim 1, in which the two slide plates are mounted to slide in a substantially common plane.

3. An operating mechanism according to claim 1 or claim 2, in which the pin of each pin and slot connection is carried by the respective slide plate, and the slot is provided in the drive member.

4. An operating mechanism according to claim 3, in which the drive member has a central hub portion for receiving the spindle of the operating handle, and two diammetrically opposite arms extending radially from the hub portion and containing the slots of the pin and slot connections.

5. An operating mechanism according to any one of the preceding claims, in which the drive member and the slide plates are housed in a casing, and the slide plates are guided linearly within the casing by interengaging guide means provided on the slide plates and the casing.

6. An operating mechanism according to claim 5 when dependent on claim 3 or claim 4, in which the guide means includes the pins which are carried by the slide plates, and respective guide slots which are formed in at least one of the casing side walls and which receive the pins and extend parallel to the direction of movement of the slide plates.

7. An operating mechanism according to claim 5 or claim 6, in which the guide means includes a slot in each of the slide plates extending parallel to the direction of movement thereof, and a pair of lugs which are provided on the casing and are received in the slide plate slots.

8. An operating mechanism according to any one of claims 5 to 7, in which a pair of stop members are mounted within the casing to limit the turning of the drive member in each direction, and hence the travel of the slide plates.

9. An operating mechanism according to claim 8, in which both stop members are engaged by the drive member at each limit position of the drive member.

10. An operating mechanism according to claim 8 or claim 9, in which the stop members act as guide blocks for the slide plates, each slide plate having two parallel spaced limbs capable of receiving a respective one of the two guide blocks closely between them, one of the limbs lying closely adjacent one of the edge walls of the casing, and the other limb lying closely adjacent the opposite edge wall of the casing.

11. An operating mechanism according to claim 10 when dependent on claim 2, in which the two limbs of each slide plate are of unequal lengths, the longer limb of each slide plate being aligned with the shorter limb of the other slide plate.

12. An operating mechanism according to claim 1, substantially as described with reference to the accompanying drawings.

13. A door or window fastener in which two longitudinally slidably mounted locking bars are driven by an operating mechanism simultaneously in opposite directions to fasten or unfasten the door or window, the locking bars being arranged to operate respective locking members which are pivotally mounted in fixed housings such that the locking members are engaged by the locking bars and caused to rock to a projecting, fastening position when one of the bars is moved in one direction and the other bar is moved simultaneously in the other direction, and the locking members are engaged by the locking bars and caused to rock back to a retracted, unfastening position when the locking bars are moved in the opposite directions.

14. A fastener according to claim 13, in which the locking members are moved to the fastening position when the locking bars are moved away from each other.

15. A fastener according to claim 13 or claim 14, in which the locking members are in the form of hooks.

16. A fastener according to any one of claims 13 to 15, in which the locking bars overlie the locking member housings and are provided with actuator slots through which the locking members are arranged to move, each locking member being engaged by one end of the respective actuator slot to move it to the fastening position, and by the other end of the actuator slot to move it back to the unfastening position.

17. A fastener according to claim 16, in which said other end of each actuator slot overlies a portion of the respective locking member when the locking member is in its retracted position to hold the locking member firmly in the retracted position.

18. A fastener according to claim 16 or claim 17, in which the locking bars are provided with further slots forming guide slots through which project headed guide pins carried by the locking member housings.

19. A fastener according to any one of claims 13 to 18, in which the fastener is of the espagnolette type and the ends of the locking bars are arranged to engage in fixed keepers when the bars are moved away from each other.

20. A fastener according to any one of claims 13 to 19, in which the operating mechanism is a mechanism according to any one of claims 1 to 12.

21. A fastener according to claim 13, substantially as described with reference to the accompanying drawings.